ON THE MOUNTING OF RADULÆ FOR MICROSCOPIC EXAMINATION.

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PLATE VII.

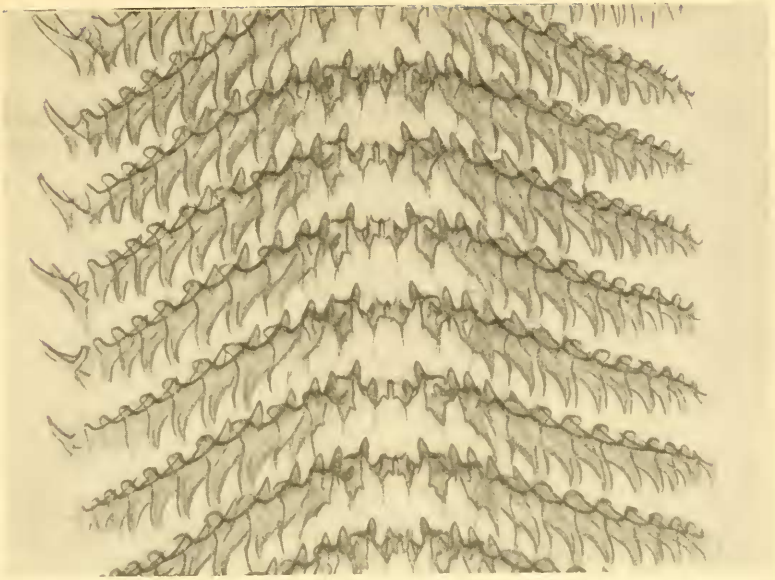
It is usual to mount objects destined for microscopical examination in some medium having approximately the same refractive index as the glass (or the average of the glasses) used in the construction of the lenses of the instrument. When this rule is transgressed the full resolving power of the microscope cannot be utilized. Radulæ are, in practice, usually mounted in a medium of lower refractive index than glass. This is done because otherwise they would be invisible, or nearly so, unless viewed by polarized light.

The polariscope method is very satisfactory with large species and low magnifications. The object is mounted in Canada balsam, and is barely visible on the slide, but with the aid of polarizer and analyser it shows up brilliantly. When, however, the smaller forms are reached, it is found that little can be seen, unless prisms of phenomenal size and transparency are employed, together with a powerful light. I therefore regard the polariscope method as ineligible.

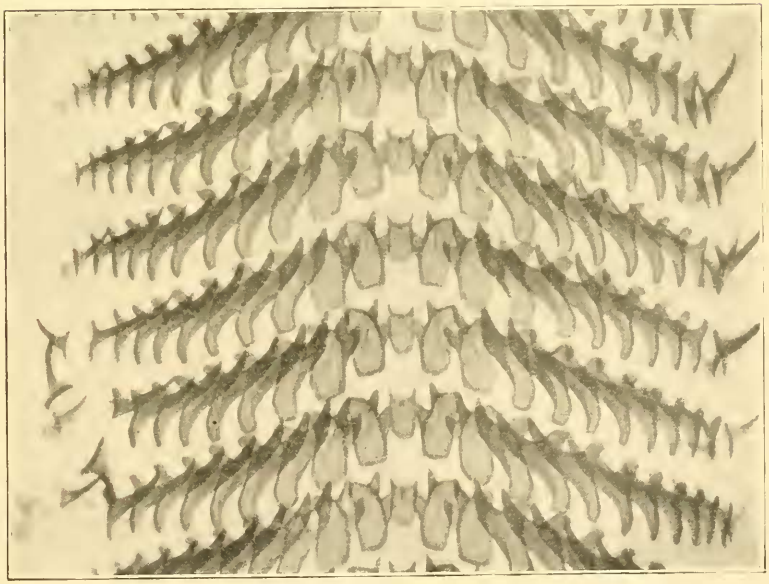
The ordinary preparations of radulæ in glycerin jelly are of varying visibility, because it is not possible to standardize the amount of water or glycerin included in the mount. I have successfully used in place of glycerin jelly Professor Gilson's euparal, an artificial resin of low refractive index. It is much easier to employ than glycerin jelly, requires no ringing, and has the advantage of not being an aqueous medium. But it has the optical disadvantages inseparable from a medium of low refractive index. Dr. Boycott uses Farrant's medium, by which results similar to those of glycerin jelly are produced. Oxidation eventually occurs.

Glycerin jelly has been advocated and used by practically all the highest authorities on the subject of radulæ. Therefore I have returned, time after time, to its use; only to be convinced each time that the optical disadvantages involved were real and insuperable. The camera is a severer critic of the microscopic image than the most fastidious microscopist, because it possesses no power of accommodation, and is incapable of ignoring distortion of form. And the camera, as I read its verdict, is plainly adverse to mounting in any but a homogeneous medium. Particularly bad are the results with high powers, for several reasons. The radulæ consist of fine serrated lines of structure, and these of themselves form diffraction gratings interfering with the normal diffraction system of the instrument. The apparent distance between the two layers of structure is greatly exaggerated, in addition to the exaggeration which naturally results from the use of a high numerical aperture, which is necessary for definition. And that aperture itself requires to be cut down in order to produce contrast, so that the efficiency of any objective is reduced

A.



B.



RADULA OF POLITA SYDNEYENSIS.

A. Mounted in glycerin jelly.
B. After staining and remounting in Canada balsam.